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THE UNIVERSITY OF ALBERTA

TELECONFERENCING PHYSICAL ASSESSMENT: EXPERIMENTAL STUDY OF A PSYCHOMOTOR SKILL IN NURSING

BY

© PATRICIA ANN PICKETTS

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF EDUCATION

DEPARTMENT OF EDUCATIONAL ADMINISTRATION

EDMONTON, ALBERTA

FALL 1987

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled TELECONFERENCING PHYSICAL ASSESSMENT: EXPERIMENTAL STUDY OF A PSYCHOMOTOR SKILL IN NURSING submitted by Patricia A. Picketts in partial fulfillment of the requirements for the degree of Master of Education.

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Supervisor

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DATE 5/7/87

ABSTRACT

This study was undertaken to compare psychomotor learning of eight specific aspects of physical assessment, an advanced nursing psychomotor skill taught by teleconference, traditional and self-study methods.

Data were collected using a pretest and posttest questionnaire and psychomotor performance criteria. Demographic, academic, instructional and psychomotor performance information was collected from three groups of nurses taking a non-credit physical assessment course each by a different teaching method.

Data were analyzed using frequency and percentage distributions to describe equivalency of the groups on demographic, academic and instructional data. Ranking of the importance of and confidence with aspects of the skill was performed. Relationships among key demographic, academic and instructional variables and the psychomotor performance were determined by t-test, one-way analysis of variance and correlation procedures.

The findings derived from the statistical analyses of the data show that the teleconference (A) group had

the highest psychomotor mean scores on the pretest, but the scores on the posttest were at a significantly lower level of performance than the traditional and self-study groups. The traditional (B) and self-study (C) group each gained significantly on the posttest scores, but on comparison there were no significant differences between the two groups.

Practice, confidence and attitude were significantly related to psychomotor performance. The teleconference (A) group showed a high correlation between attendance at sessions and learning.

The major findings of the study are at variance with some of the findings in the review of literature and suggest a need for further research. The findings have implications for nurse educators involved in continuing nursing education and distance delivery programs.

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CHAPTER 1

STATEMENT OF THE PROBLEM AND ITS SIGNIFICANCE

INTRODUCTION

The Canadian nursing education scene is undergoing changes. Entry to practice positions have been taken by the Canadian Nursing Association and many of the provincial associations. In 1982, the Canadian Nursing Association adopted the position that by the year 2000, the minimal educational requirement for entry into the practice of nursing should be the successful completion of a baccalaureate degree in nursing. This level of educational practice is deemed necessary if nurses are to fulfill their roles and responsibilities within the framework of the future health care delivery system. Increasing numbers of nurses are seeking education beyond the diploma level and they are participating in further education by studying on a part-time basis (Statistics Canada. Registered Nurse Data. 1985).

Alberta nurses are recognizing the need for additional educational preparation for practice beyond the basic diploma level (Richardson and Sherwood,

1985). They are expressing the need for increased clinical practice expertise and further ability to respond to the total health care needs of patients and families (Shantz, 1985).

In recent years, there have been improvements in the availability of part-time studies, and development of innovative programs such as distance education. Teleconferencing's first applications go back to the 1930's, but only recently has it been used by a greater spectrum of people. According to Olgren and Parker (1983:1)

> Its emergence on a wider scale is based on the coupling of two major factors: better teleconferencing technologies and the socioeconomic climate of our time. Teleconferencing appears to answer many of today's problems: productivity, communications, information management, decision-making, continuing education and travel and energy costs. The propelling force for teleconferencing is change. The world is changing at an unprecedented rate, affecting our societies, the manner in which we live, work and are educated. This changing world is creating a need to readjust our traditional approach to business and education.

Olgren and Parker (1983:2) suggest teleconferencing is in transition. It is experiencing rapid technological advances, new applications in the world and new suppliers and consumers. One of these consumers is health education.

The Educational Resources Information Center (ERIC) Thesaurus included the definition of distance education in 1983.

> Distance education is education via the communication media (correspondence, radio, television and others) with little or no classroom or other face-to-face contact between students and teachers

Distance education in Alberta has evolved to mean adult education facilitated by technologies that promote greater access to learning situations.

Berghofer (1983:22) suggests that there is a symbiotic relationship between technology and learning. He argues that we cannot assume that our present organizational patterns for providing learning will meet the needs of learners in the twenty-first century, any more than those of the nineteenth century would have met the needs that we have today.

The "ideal" learning opportunity has traditionally been a process which provided the learner with face-to-face contact with a teacher or a system that provided interaction directly. Technologies have emerged which provide interactivity between the learner and teacher regardless of distance. Teleconferencing allows for interactive learning situations.

Canada is a very large country inhabited by a relatively small population. Many regions of the country are characterized by a small number of people spread over a great distance. The task of bringing continuing education to these people is overwhelming. The rising costs associated with attending courses,

conferences and workshops combined with a reduction in funds available for continuing education and the rapidly expanding base of information necessary to practice quality health care are all reasons for developing alternative delivery methods.

Nurses, isolated by distance from educational opportunities are able to obtain further education through teleconferencing. Teleconferencing has become accepted in the field of nursing as a viable method of presenting traditional nursing content.

One of the ways nurses are seeking further learning opportunities is by enrolling in courses which teach advanced psychomotor skills such as health assessment of patients. Health assessment involves a series of psychomotor and critical thinking activities carried out while obtaining a health history, performing a physical examination and arriving at a nursing diagnosis. It enhances the nursing process by facilitating data collection, enables nurses to share a common framework with other members of the health team, and provides a basis for health promotion as well as health restoration (Natapoff, 1982:44).

From the limited number of studies reporting the effectiveness of teleconferencing, there is evidence that it is an effective means of learning and that students react positively to it as a teaching method.

There is a dearth of information about teleconferencing psychomotor skills. A study involving the effectiveness of learning a psychomotor skill via three delivery methods; teleconferencing, traditional and self-study, provides an opportunity to examine the effectiveness of teleconferencing.

THE PROBLEM

The main purpose of this study was to compare psychomotor learning of eight specific aspects of physical assessment, an advanced nursing psychomotor skill, taught by teleconference, traditional and self-study methods.

Several sub-problems emerged from the basic problem.

1. Is there a difference in the participant's psychomotor performance of physical assessment when the skill is taught by teleconferencing compared to traditional and self-study methods?

2. To what extent does the pretest importance attached to these skills affect psychomotor performance when the skill is taught via teleconferencing, traditional and self-study methods?

3. To what extent do demographic and academic variables of age, nursing experience, and educational preparation affect the psychomotor skill performance of physical assessment?

4. To what extent do instructional variables such as practice, cognitive learning time, confidence and attitude affect the psychomotor performance of physical assessment?

IMPORTANCE OF THE STUDY

A study of this type should add to the limited information available on teaching an advanced psychomotor skill via teleconferencing. It should contribute to an exploration of the potential of audio teleconferencing in the delivery of complex psychomotor skills, especially to nurses who are unable to attend traditional courses. The study should also contribute information about nursing techniques that provide for more efficient, effective patient care.

The study is needed to provide information about alternate instructional methods for teaching psychomotor nursing skills. The present study arose out of a concern that an alternate instructional method was being used to teach advanced psychomotor nursing skills without research to determine the effectiveness of the instructional strategy. The information should be of use to the providers of continuing nursing education, including colleges, universities and other organizations which provide health education. (The Alberta Hospital Association has endorsed this research by sending a letter of support for the study to the participating hospitals.)

The Alberta Association of Registered Nurses has taken the position that by the year 2000 the basic entry requirement to practice will be the baccalaureate degree. This has prompted colleges and universities with nursing programs to look at alternate instructional methods (Moore and Osbourne, 1986:26). Increasing numbers of nurses are seeking alternate ways to complete a post basic baccalaureate degree. Nurses are anxious to take academic courses that can be used for university credit or courses that will prepare them to challenge required university courses (Guillemin 1982).

Berghofer (1983:25) charged the educational community with the task of increasing collaborative efforts involving educational institutions, industry and other agencies. The focus of these efforts should be to create flexible learning opportunities that meet the learning needs of individuals in places and times convenient to them and in relation to a changing definition of work.

Nurses, like others, are requesting that consideration be given to their need to have courses available at times and locations that allow them to maintain their concurrent role of employee, family member and student (Guillemin 1982). Educational institutions are considering these requests and allowing nurses to pursue their desired goal.

Educators who administer and teach in the traditional educational system are challenged to reallocate resources and efforts toward a more distributed system of education by identifying which learning needs are best served in the traditional setting and which are best handled in alternate ways (Berghofer 1983:26).

Audio teleconferencing is available and being used in Alberta for continuing education. Institutions such as Athabasca University, University of Calgary and University of Alberta presently utilize it. Grant MacEwan Community College uses audio teleconferencing as an instructional methodology in the Post Basic nursing certificate programs offered by distance education. The Alberta Hospital Association began an audio teleconferencing network in 1984 to assist with staff development programming for all levels of hospital personnel.

In an effort to educate more nurses at the baccalaureate level, since 1980 there has been a rapid increase in Alberta of nursing courses with a theory component being taught via alternate teaching methods. Audio teleconferencing technology is one of the instructional methods being utilized. Nurse educators have questioned whether psychomotor skills and clinical courses that require demonstration and supervision, such as health assessment, could be taught using teleconferencing (Hauf 1985:160).

Health assessment makes up an essential part of the first step of the nursing process. As well as serving as a foundation for health promotion, it also provides a common language for communication with other health professionals. A beginning level of competence in health assessment is now expected of the baccalaureate nursing graduate as well as of the practising nurse in many settings. A deficit in performance exists for many nurses because of this expectation. Newly employed nurses identified physical assessment skills as an area in which they evaluated themselves as being deficient (Boyd and Conrad 1981:58).

Nurses in Alberta are seeking more expertise in physical assessment as evidenced by a recent needs survey (Richardson and Sherwood, 1982). In this survey, health assessment of children and adults placed 12th and 20th, respectively, on a list of sixty-four content areas preferred for non-degree continuing education nursing.

This study should be of interest to nurse educators who believe that there are alternate methods for effectively learning the psychomotor skills necessary for giving quality nursing care to patients.

DEFINITIONS OF TERMS

Distance education, Education via the communication media (correspondence, radio, television and others) with little or no classroom or other face-to-face contact between students and teachers (ERIC Thesaurus 1983).

Audio teleconferencing, Two-way electronic communication of a speaker's voice and amplified to two or more groups at several locations. The participants at each location can interact with one another and the speaker. To interconnect people, teleconference systems use telecommunication channels that range from regular telephone lines to sattelite links.

Teleconference instructional method, Teaching of a course by transmission of an instructor's voice over a telephone line and amplified in several classroom locations

Traditional instructional method, Face-to-face instruction that takes place in the classroom or laboratory setting.

Self-study instructional method, Instructional strategies which do not require direct, physical presence of the instructor, such as videotapes and learning modules.

Health assessment, A series of psychomotor and critical thinking activities carried out while obtaining a health history, performing a physical assessment and arriving at a nursing diagnosis (Natapoff, 1982:44).

Physical assessment, The physical examination portion of health assessment as performed by a nurse.

ASSUMPTIONS, LIMITATIONS AND DELIMITATIONS

Assumptions

1. Participants are taking the physical assessment courses because they wish to improve their performance of the skill.

2. Change in performance of the eight specific skills of physical assessment can be attributed to learning acquired by a teaching method.

Limitations

1. The findings should be applied only to the population being studied. Inferences made to other nurse populations should be made cautiously.

2. The sample size was small and instructional groups varied in size.

3. Exposure to the performance evaluation criteria during the pretest might have developed test "wiseness" in the participants.

4. Interaction with th instructor in the

teleconference group was limited due to the number of sites on the bridge.

5. Participant motivation could not be controlled and could be a factor influencing performance.

6. Lack of control over attendance and practice have influenced the posttest results.

7. Instructor bias may have influenced the teaching and thus favored one method over another.

8. A control group was not used.

Delimitations

1. The study was restricted to selected self-study and teleconference locations within 200 kilometers of Edmonton.

2. The performance of physical assessment skill was limited to eight specific aspects performed in daily nursing care.

3. The study was restricted to a non-credit course.

ORGANIZATION OF THE THESIS

This chapter contained an introductory statement about the area of study. The problem and sub-problems which emerged from the basic problem were identified. Discussion of the importance of the study was followed by a definition of terms. In the final section of the

chapter, the assumptions, limitations and delimitations of the study were outlined.

Chapter 2 contains a review of literature and research relating to the problem. In Chapter 3, the methodology and instrumentation are discussed. The research design, instrumentation, sample selection and procedures for data analysis are presented.

Chapter 4 presents the results of the data analysis; and Chapter 5 presents a summary of findings, conclusions and implications of the study.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE AND RESEARCH

In this chapter psychomotor skill acquisition, alternate instructional methods and the teaching of health assessment are explored. An examination of psychomotor skill learning in nursing is contained in the first section. The alternate instructional methods of teleconferencing and self-study are examined and comparisons are made to the traditional method of instruction. The specific nursing psychomotor skill, health assessment is discussed.

PSYCHOMOTOR SKILL ACQUISITION

Nurses continue to learn and develop psychomotor skills to help them adapt to the demands of the reality-based work world. Hanson (1971:68) defined skill as "a particular, more or less complex activity which requires a period of deliberate training and practice to be performed and which often has some recognized useful function."

Review of the literature revealed four common elements of a skilled performance. It should

1) involve a chain of motor responses, 2) require the coordination of perceptual input with these motor responses, 3) involve an hierarchy of responses, and 4) depend on feedback.

Many theories exist in the literature about the learning of psychomotor skills. Stimulus-response reinforcement theory of examining movement was popular in the early study of this area (Ellis 1972, Day 1986, Singer 1980). Product-orientated theories of skill acquisition were also popular (Schmidt 1974, Singer 1977). More recent models recognize the cognitive components of learning a skill and information processing models have emerged. Such a model was developed by Gentile (1972).

Gentile (1972) developed a skill acquisition model that had seven steps. Shee viewed motor skills as a series of information processing tasks. According to the model, the learner must first perceive the skill and desire to learn it. Second, the learner must begin to differentiate between relevant and irrelevant influencing factors and focus on the relevant factors only. Next, the learner must have a mental blueprint or motor plan of the skill and only then is the learner ready to perform the skill. After performing the skill, feedback must be perceived and compared to the original motor plan and discrepancies noted between the

Gomez (1984:35) developed a model of the initial stage of skill acquisition that was very similar to Gentile's (1972) model. The model described how the learner started with a GOAL such as taking a pulse. A POPULATION OF STIMULI referred to the setting in which the skill was to be performed. Aspects such as sensory stimuli plus environmental characteristics were considered. The learner had to give SELECTIVE ATTENTION to the population of stimuli that were relevant to the goal. FORMULATION OF A MOTOR PLAN was the next step in the model and consisted of a pattern that conformed to selected environmental conditions, stimuli and the goal to be achieved. Performance of the motor plan was called EXECUTION. FEEDBACK followed execution. With the feedback information, the learner made a DECISION about continuing with the motor plan or changing it, which made the NEXT RESPONSE possible.

Feedback about performance of a skill can occur in two ways. Intrinsically, it is received via the learner's sensory system. Augmented feedback is received in other ways, such as teacher observation, videotapes and performance checklists (Gomez,1984:112).

Singer (1975:116) stated that the level of motivation will affect the performance of a complex skill. Singer reported that for any learning task,

two. The motor plan must be revised before the skill is attempted again. The perceived feedback, comparison to the mental blueprint and revision of the motor plan can be repeated until manual dexterity is achieved.

Pease (1977) developed a teaching model for motor skill acquisition. For each of the seven learner components in Gentile's model seven corresponding components for teachers were developed and applied to acquiring a sports skill during physical education courses. Gentile's model described how learners must learn how to learn, and Pease's work went further and developed a model to teach learners how to learn.

Singer (1975) proposed a systems model for learning psychomotor skills. This model contained behavioral objectives as pre-instructional strategies, entry skills and characteristics of the learner, task analysis, instructional sequencing, instructional process and performance evaluation or terminal behaviors as components of the system.

Singer (1977:120) stated:

> In the systems approach, the entry behaviors of the students would be measured and expected terminal behaviors specified and evaluated. Instructional strategies are carefully sequenced so as to lead to the realization of objectives. The teacher becomes the manager of instruction attempting to facilitate learning in a variety of ways.

motivation must be sufficient to cause the learner to attempt the task especially if it is difficult. Before the task commences, the learner must want to master the task and achieve a proficient performance in the skill.

Haukenes (1983:9) discussed issues surrounding the psychomotor skills component within the baccalaureate curriculum. She suggested one answer to the problem of placement and teaching of these skills was the use of the laboratory with self-instruction as the major teaching method. She seemed to support Gentile's model when she stated:

> The students have the freedom to practice component parts of a task within the college laboratory, taking time needed to investigate, discover, make errors and correct those errors.

She concluded that psychomotor skills in a baccalaureate nursing program could be learned through self-paced learning opportunities in a college laboratory setting.

ALTERNATE INSTRUCTIONAL METHODS

The learning of nursing skills involves the cognitive, affective and psychomotor domain. Controversy exists regarding the instructional method best suited to skill acquisition. Answers based on research appear to be lacking in the literature.

Kuramoto (1978:29) wrote that non-traditional study has been incorporated into nursing programs such as the external degree, the university without walls and the open university. Alternate instructional methods such as teleconferencing and self-study are two non-traditional types of methodologies that are being used increasingly.

A teleconference program to deliver continuing education to medical library staff was initiated through the Educational Telephone Network, Wisconsin. Berk (1982:27) concluded that teleconferencing holds significant advantages over the face-to-face format in the continuing education field. Berk (1982:21) listed the advantages and disadvantages of traditional instruction for this particular program. The advantages were face-to-face interaction, shared participation in the learning activity, spontaneity of the learning experience and instructor control over attendance, evaluation and administration of tests. The disadvantages, identified by Berk, were limited enrollment, programs only available to those free to travel, inflexible scheduling, fees and expenses for instructors.

Meyer (1983) described a fifteen year experience by the Department of Continuing Medical Education,

University of Wisconsin with teleconferencing for instructional purposes in non-credit continuing medical education. He reported:

> With the perspective of fifteen years of use and experience, it is clear that the telephone is a viable means of providing a comprehensive continuing education program for hospital staffs and for the medical staff.

He reported drawbacks such as lack of eye contact, foreign accents reduced attention span and demonstrations demanding movement requiring videotapes.

A three-year study at the University of Washington School of Nursing, compared teacher "live" classes, teleconference classes and independent study packages. Kuramoto (1982) reported learning was associated with all three delivery methods and there was no significant difference in learning between the "live" class and the teleconference class. However, the independent study group showed significantly higher mean scores than the other two groups. In the same study, Kuramoto reported that nurses had a positive attitude toward teleconferencing and independent study within a hospital setting. The independent study method was highly preferred by institutions in small communities as a mechanism for staff development. It was found to be cost-effective and effective in terms of nurses' learning and satisfaction.

Parker and Monson (1980:24) reported that attitude surveys of teleconference users showed a high level of user satisfaction. This concurs with Kuramoto's (1982) findings.

Black (1981) found that undergraduate students taking a statistics class via teleconferencing did as well, or even better in some instances than most campus-based students at the University of Calgary.

Guillemin (1984) concluded that a large interest was expressed by rural Alberta nurses in credit courses for a baccalaureate degree through teleconferencing. Guillemin (Cited in AARN Newsletter, May 1985:26) stated:

> This means that these nurses are interested in pursuing credit course work through an independent study method, where learning, not teaching is the decisive factor.

The results of a study conducted by Kirman and Goldberg (1982) at the University of Alberta showed that the teleconference students did significantly better than the students taught by the traditional method. Due to the number of uncontrolled variables, the learning could not be attributed to the delivery mode. However, the study did show that the delivery mode was sufficient for imparting new knowledge.

Billings et al.(1986) reported that correspondence courses provide an instructional alternative for nursing students. Students who choose correspondence

versions of courses reported flexibility, independence and saving of time and money. Faculty and administration have found this instructional alternative a way of providing flexibility and creativity for the curriculum.

A study reporting traditional and independent self-paced instructional methods used to teach a critical care nursing orientation found the independent method as effective as the traditional method. The students were significantly more satisfied with the independent method than the traditional method (Hansell and Foster, 1980).

Watson et al. (1984) found no significant difference in learning nursing psychomotor skills by traditional methods or by independent study. The University of Calgary study recommended that the research be repeated with a larger sample and more controls on the study.

TEACHING OF HEALTH ASSESSMENT

A health assessment course that was part of a nursing baccalaureate degree program was piloted at University of North Dakota. Hauf (1985) concluded that the absence of the lecturer on-site was not a significant factor in the learning of the skill. The grades of the teleconference students were

significantly higher than those of the on-campus students. Hauf concluded that teleconferencing was an effective delivery for the teaching of health assessment, and that the students had adapted well to what was initially an unfamiliar mode of learning.

Wallhead (1982) surveyed the Canadian Universities to determine the direction nursing programs were taking toward the teaching of health assessment. Forty-three percent of the schools reported that nurses required these skills for primary care nursing, while fifty-seven percent considered the skills essential to the implementation of the nursing process. Lynaugh and Bates (1974) cautioned that introducing health assessment skills into a nursing program involved three risks: underestimating the resources and time required to develop competence, secondly, underestimating the depth of competence required and lastly, placing a disproportionate value on the skills themselves.

Colwell and Smith (1985) reported that many of the aspects of the physical assessment skills were being utilized in the clinical setting. Eleven skills were identified as being used daily by nurses. No significant differences were found in utilization of skills between nurses with a separate course and those from an integrated curriculum.

SUMMARY

In this chapter, theoretical and research literature were reviewed in an effort to provide and develop the background for the study. The literature suggested that psychomotor skill acquisition have very definite steps that should be considered when psychomotor skills are taught via alternate instructional methods.

Research seemed to suggest that teleconference and self-study are viable delivery methods for cognitive skills, and there were a few studies that indicate successful teaching of psychomotor skills via teleconferencing. The literature also suggested that many of these studies had limitations and should be repeated.

The literature, although scarce, suggests that health assessment is an important aspect of the nurses' education and could be taught via teleconferencing at least as effectively as other instructional methods.

CHAPTER 3

INSTRUMENTATION AND METHODOLOGY

A description of the instrumentation and methodology is contained in this chapter. The first section of the chapter focuses upon the research design. In the second section, the instrumentation used in the study is described, and the remainder of the chapter deals with the data collection procedures and analysis of the data.

RESEARCH DESIGN

A quasi-experimental design was adopted to investigate the learning effectiveness via teleconference instruction as compared to traditional and self-study instruction for the psychomotor component of eight specific aspects of the physical assessment skill. The independent variable was the instructional method and the dependent variable was the performance of the physical assessment skill. Additional independent variables included age, nursing experience, educational preparation, confidence and attitude toward the skill.

The sample was randomly selected from a list of volunteers. The experimental groups learned by teleconference, traditional and self-study instruction. Psychomotor levels were measured prior to commencing the experimental instructional method and again following the instruction. All questionnaires were administered and performance testing was conducted by the investigator, eliminating the need for inter-rater reliability studies.

INSTRUMENTATION

Choice of Instruments

A written questionnaire and a psychomotor performance evaluation were used in each of the pretest and posttest phases of the study. The written questionnaire was used for data collection because it is relatively inexpensive and time efficient. It can be distributed to and collected directly from the participants. It can be used in conjunction with other techniques to supplement findings. The questionnaire helps ensure anonymity and prevents researcher bias. For these reasons, the information collected is usually accurate and gathered efficiently.

The pretest and posttest questionnaires, entitled Physical Assessment Pretest and Physical Assessment Posttest were developed for this study from information

gathered from a variety of sources. The psychomotor performance evaluation criteria were taken from the Kot et al (1986:100-112) instrument titled, "Physical Examination Observation Tool."

Development of the Instrument

The development of the written pretest and posttest questionnaires relied heavily upon the investigator's personal experience in the instructional role, in addition to colleaques' comments obtained through discussion. Seven of the eight physical assessment skills common to daily nursing care that were selected for inclusion in the study were taken from Colwell and Smith's study (1985).
The remaining skill, selected by the investigator, was based on her nursing experience and through discussions with nursing education colleaques.

The psychomotor performance evaluation criteria instrument was taken directly from the Kot et al. (1986:100-112) study, "Learning Effectiveness and Efficiency using Computer-Managed learning and Lecture for Health Assessment Theory."

Validation of The Instrument

Content and face validity of the questionnaires were established by distributing the pilot

questionnaires to 12 staff duty nurses who were employed by the Royal Alexandra Hospital and who would have been eligible to be in any of the three groups being formed if they had volunteered. The pilot questionnaires were also distributed to two nursing education colleagues who teach physical assessment using traditional methods, and one of these colleagues also uses teleconferencing to teach physical assessment. The pilot questionnaires were also reviewed by Dr. A.G. Konrad, the investigator's thesis advisor at the University of Alberta. These individuals were asked to review the questionnaires for length of completion time, clarity, content and format. From the suggestions, minor revisions were made.

During the Kot et al. (1986) study, the validity of the psychomotor evaluation criteria was established by a panel of experts and by use in three separate courses. Inter-rater reliability was determined by evaluators scoring students independently, followed by group comparisons. It was assumed that extracting the criteria for the eight specified skills being evaluated in this study would not alter the validity and reliability of the instrument.

The Instruments

Pretest questionnaire. A copy of the final form of the pretest questionnaire appears in Appendix A.

The pretest questionnaire is composed of three sections relating to A) Demographic data; B) Academic data; and C) Specific Skills data.

Section A, Demographic Data, contains items numbered 1-6 which identify present position, clinical area of practice, years of nursing experience, age, gender, and educational background.

Section B, Academic Data, contains questions 7-12 which identify previous courses in physical assessment, type of physical assessment course taken, length of the course, reasons for taking the course, confidence level with the skill and attitude toward the teaching method.

Section C, Specific Skills Data, includes specific skills numbered 1 to 10 which the participants were asked to rate the importance of these ten skills to them in their work and also to rate the level of confidence they felt performing each skill. The eight specific skills being evaluated in this study were expanded to ten aspects in this section in order that the participant was very clear about the part of the body anatomy that was being assessed. The ten aspects were collapsed to the eight specific skills for statistical analyses in keeping with the divisions used in the Kot et al. (1986) study from which the performance criteria were taken.

The following rating scale was used.

IMPORTANCE	CONFIDENCE
1. not important	1. not confident
2. slightly important	2. slightly confident
3. important	3. confident
4. very important	4. very confident

The same pretest was used for all groups. Question 12 required a word change for each group to make the question pertinent to their instructional method. The word teleconference, face-to-face or self-study was substituted appropriately before administering the questionnaire.

The Posttest questionnaire. The posttest questionnaire in its final form is included as Appendix C. The questionnaire is composed of two sections; A) Learning Style Data and B) Specific Group Data.

Section A, Learning Style Data, contains five questions on confidence, strategies used to learn, supplemental learning resources, hours of practice, and style of practice that were answered by participants in each of the three groups.

Section B, Specific Group Data, contains three questions specific to each group. Participants were asked to indicate how many hours they spent learning, excluding practice hours, to identify their attitude

toward their teaching method, and to indicate whether they would learn another nursing skill taught by that teaching method in the future.

Performance Evaluation Criteria

The psychomotor performance evaluation criteria for the eight aspects of the physical assessment skill appear in Appendix B. The performance criteria were used during the pretesting and posttesting phase. The eight specific physical assessment skills evaluated were as follows:

1. Assessing the head/neck area
2. Auscultating breath sounds
3. Auscultating heart sounds
4. Assessing bowel sounds
5. Assessing bladder distention
6. Assessing range of motion
7. Palpation peripheral pulses
8. Assessing sensation

In an effort to reduce researcher bias, the individual and group pretest psychomotor performance scores were not available to the reseacher during the teaching of the course and posttest phase. Coding of the forms was necessary, but participant anonymity and confidentiality was maintained.

During the pretesting and posttesting of the performance, the participants were given the title of the specific physical assessment skill and asked to perform it without benefit of the criteria. The psychomotor performance evaluation criteria had been part of the complete physical assessment criteria used during the course.

METHODOLOGY

Sample Selection

Participants for the teleconferencing (A) and traditional group (B) were selected from a list of staff duty nurses who volunteered to participate in this study. Permission and assistance to approach the hospitals that were registered members of the Alberta Hospital Teleconferencing Network was requested from the Director of Education and Teleconferencing, Alberta Hospital Association. The investigator's criteria for selection of the hospitals from this list were as follows;

1. Hospitals - 100 bed size
2. Hospitals within 200 km of edmonton
3. Minimum four participants per site.

From the eligible list of hospitals, two other lists were made to select the teleconference group (A) participants. One list was comprised of those hospitals that had registered for a teleconference

series taught by the investigator, called Introduction to Physical Assessment, scheduled by the Alberta Hospital Association to run from September 12 to November 30, 1986.

A second list was made of the hospitals that did not register for the teleconferencing series, and the self-study group (C) was selected from these hospitals.

Letters were sent to the administrator and director of nursing from four hospitals randomly selected from each of these two lists. With one exception, the hospital's administration gave permission for their staff duty nurses to be approached about volunteering for the study. The hospital that refused permission did so because they had held an inservice program on physical assessment the previous year and felt there would be insufficient volunteers. The remaining hospitals provided opportunities for an explanatory letter to be distributed to their staff.

A copy of the explanatory letter and consent form are contained in Appendix D. The section of the letter describing the participant's involvement varied according to the group for which they were being asked to volunteer. It was not possible to randomly assign volunteers to groups because of the scheduling of each of the three non-credit courses and the distances involved for some of the participants.

Thirty-five nurses volunteered from the list of group A hospitals involved in teleconferencing, and twenty-nine nurses volunteered from the list of group C hospitals. Twenty-five nurses from each group were selected using the table of random numbers. These participants were contacted and arrangements were made for pretesting prior to commencement of their physical assessment course. Five volunteers from group C did not keep their appointment. Due to the tight schedule for pretesting prior to commencement of the course, there was insufficient time to add to Group C and this reduced the group size to 20 participants.

The traditional group (B) participants were nurses who had registered for Health Assessment Workshops offered by the Outreach Department, Grant MacEwan Community College and taught by the investigator between September 16 and December 6, 1986. Workshop registrants were given the same explanatory letter as Groups A and C and were asked to volunteer. Twenty-one people volunteered, so all were used in the study.

Each of the participants in the three groups shared similarities in the learning experience. The non-credit course on physical assessment that they were taking was taught by the investigator. A common workbook and videotapes were used by each group. All were female registered nurses who had volunteered to participate in the study.

A difference that must be acknowledged was the monetary investment and support from the employer. The teleconference group (A) participants did not pay the fee for their course, however, their employing hospital paid the fee levied by the Alberta Hospital Association for the teleconference series. It was not known by the investigator how much support or expectation was put on each participant by their employer. The traditional group (B) participant paid the fee charged by Grant MacEwan Community College for the workshop. In most cases the employer reimbursed the participant. No specific data were available on this reimbursement. The self-study group (C) did not pay anything for their course, and the employers verbally supported their participation but did not give any release time for the course as group B and C's employers had done.

Data Collection

Meetings with each group at their employing institution took place in September. During these meetings, the nature of the study was explained and assurance was given regarding confidentiality and anonymity. A copy of the consent form signed by each participant during this meeting appears in Appendix D. Arrangements were made for pretesting that suited both the investigator and participant's schedule. Each pretesting appointment took approximately 30 minutes.

The workbook was distributed to the group when pretesting was completed, and arrangements were made for a central location for videotapes and a textbook that was used in conjunction with the physical assessment course. Table 1 summarizes the schedule of the experimental instructional methods.

In December 1986, the teleconference (A) and self-study (C) participants were contacted to arrange for posttesting. Posttesting appointments were forty minutes per participant. The traditional group (B) participants were tested upon completion of the workshop.

A total of twenty-two participants in the teleconference group (A) completed the written posttest questionnaire and demonstrated the eight specific physical assessment skills to the investigator. A dropout rate of twelve percent was experienced in this group. Lack of time to attend the sessions, inconvenient scheduling time and equipment problems were the reasons given for withdrawal. The traditional group (B) did not experience any attrition, while the self-study group (C) experienced the highest loss at thirty percent. Only fourteen of the original 20 who were pretested completed the posttest phase. Of the six participants who withdrew, two people moved from

Alberta, two were ill and hospitalized, and two cited lack of time due to other commitments and heavy content as the reason for withdrawing. Table 2 summarizes the participation rate by group.

DATA ANALYSIS

The pretest, posttest questionnaires and psychomotor performance criteria instruments were designed to facilitate key punching of the raw data which could then be transfered directly to computer data cards. The data were analayzed utilizing the crosstabulation program of the Statistical Package in Social Sciences (SPSS).

The following statistical analyses were utilized in this study.

1. Frequency and percentage distribution was utilized to describe demographic and academic data.

2. Ranking of specific skills by means was done to identify the importance and confidence levels of the groups.

3. Differences in psychomotor performance means by groups were examined by *t*-tests and one-way analysis of variance procedures.

4. Differences in performance means by groups and

Table 1

Schedule of Experimental Instructional Methods

Group A (N=22)	Group B (N=21)	Group C (N=14)
Pretest	Pretest	Pretest
Teleconference series 16 hours	Workshop 14 hours	Self-study for 10 weeks
Posttest	Posttest	Posttest

Table 2

Participation Rate By Group

Group	Pretest	Posttest	Dropout %
Group A			
Teleconference	25	22	12
Group B			
Traditional	21	21	0
Group C			
Self-study	20	14	30

the importance of key demographic, academic,and instructional variables were examined by *t*-test and one-way analysis of variance procedures.

5. Correlation statistics were used to examine relationships

SUMMARY

A written questionnaire and assessment of psychomotor performance level were used for collection of data in the pretest phase. An experimental instructional method was used. A written questionnaire and reassessment of psychomotor performance level were employed for data collection in the posttest phase.

Three groups from small urban and rural hospitals were included in the study with each group learning physical assessment by a different teaching method. Data were analyzed to provide percentage distributions, means, one way analysis of variance, *t*-tests and correlation statistics.

CHAPTER 4

ANALYSIS OF THE DATA AND DISCUSSION OF THE FINDINGS

The findings of the study and the sub-questions of the study are addressed in this chapter. The findings are organized into three sections using comparative analysis between the teleconference (A), traditional (B) and the self-study (C) groups.

The first section includes the comparative data to determine the equivalence of the three instructional groups on the pretest and the posttest. In the second section, the differences in psychomotor performance of the groups according to the instructional method are presented. The third section contains the analysis of the relationships among the groups' psychomotor performance and key variables.

PROFILE OF THE INSTRUCTIONAL GROUPS

Pretest

Prior to commencing the physical assessment course, each of the three groups were asked to respond to ten questions regarding demographic and academic data. Pretest information concerning age, present

position, clinical area of practice, extent of nursing employment, level of education, previous courses in physical assessment, level of confidence, attitude to instructional method, and reasons for taking the course were obtained. Tables 3 and 4 summarize the percentage distributions of the instructional groups' responses to the ten questions.

Age. Table 3 shows that the teleconference group (A) had the highest number of people (18%) under the age of 25 and a high percentage of nurses over the age of 45 (23%). The self-study group (C) had the majority of people (65%) ranging in age from 35-45 years of age. There was a fairly even age distribution in the traditional group (B) over the age of 25. This group also had the highest percentage of nurses over the age of 45 (33%).

Extent of nursing employment. As shown in Table 3, all groups had a high percentage of nurses with 6 to 15 years of nursing experience (45%, 48%, 64%, respectively). The traditional instructional group (B) had the most inexperienced respondents (33%), and the teleconference group (A) had twenty-three percent. The teleconference group (A) had the largest number of nurses with over 20 years of experience in nursing (32%).

Table 3

Percentage Distribution of Demographic and Academic Characteristics of Instructional Groups

Characteristics	Group A (N=22)	Group B (N=21)	Group C (N=14)
Age*			
under 25	18	0	7
25 - 35	14	28	29
35 - 45	45	38	65
over 45	23	33	0
Years in Nursing			
0 - 5	23	33	22
6 - 15	45	48	64
over 15	32	19	14
Position in Nursing**			
Registered nurse	100	100	100
Nurse educator	0	5	0
Nurse administrator	23	5	0
Other	9	14	0

Table 3 cont'd.

Characteristics	Group A (N=22)	Group B (N=21)	Group C (N=14)
Clinical Area of Practice**			
Medicine-Surgery	69	48	50
Extended Care	0	29	29
Pediatrics	14	0	14
Psychiatry	0	5	0
Obstetrics	23	5	14
ICU-Emerg.	32	19	36
Other	50	24	29
Educational Background**			
Post-RN	9	10	0
Baccalaureate	5	14	14
Other	27	23	14
Previous Course in Physical Assessment	0	14	14

* Totals do not equal 100% due to rounding.

** Totals do not equal 100% due to multiple options applying.

Table 4

Percentage Distribution of Pretest Reasons for Taking Course by Instructional Group

Reasons*	Group A (N=22)	Group B (N=21)	Group C (N=14)
To learn more about physical assessment	96	67	79
To improve skills in nursing	91	81	93
Expected to participate in inservice	5	10	14
To obtain baccalaureate	18	24	21

* Totals do not equal 100% due to multiple options applying.

Position in nursing. All participants in the study were registered nurses (100%), however, additional responsibilities were held by some of the participants. Twenty-three percent of the teleconference group (A) were nurse administrators. The traditional group (B) had fourteen percent of the group involved in other positions in nursing. These participants were employed as occupational health nurses in hospitals and industries. The self-study group (C) were all staff duty nurses.

Clinical area of practice. The majority of each of the three groups were working in medical-surgical areas of the hospital. Twenty-nine percent of groups B and C worked in extended care nursing. The percentages in this section do not clearly reflect clinical areas of practice because small, rural hospitals do not have separate units for each of the areas that were listed in the questionnaire. The category of "Other" was chosen by fifty percent of the teleconference group (A) who indicated they worked in a rehabilitation hospital. In all three groups, nurses who worked in the operating room chose the "Other" category, not surgical nursing as had been anticipated. The confusion in interpretation of this question was not revealed when the questionnaire was piloted.

Educational background. Forty-one percent of the teleconference group (A), forty-seven percent of the traditional group (B), and twenty-eight percent of the self-study group (C) had educational preparation beyond a basic nursing diploma. Fourteen percent of the traditional (B) and self-study (C) groups had a baccalaureate degree in nursing. The remainder of the participants had short courses and certificates.

Previous courses in physical assessment. None of the teleconference group's (A) participants had previous experience with physical assessment. A small number (14%) of the traditional (B) and self-study groups (C) had a previous course. Only one person (5%) had a credit course of over 30 hours and the remainder had non-credit, short courses, under 30 hours in length.

Reasons for taking the course. The teleconference group's (A) reasons for taking the physical assessment course were mainly to learn more about physical assessment and to improve their clinical skills in nursing (Table 4). The traditional (B) and self-study (C) groups had high percentages on these two reasons also. Fairly equal percentages of people in the three groups took the course to obtain a baccalaureate degree(18%, 24%, 21% respectively). The low percentages in each group (5%, 10%, 14%) who

indicated they were expected to participate seems to reveal that most of the participants were motivated to take the course on their own and pressure was not put on them from the employer.

Pretest importance and confidence with skills. In order to clearly identify those skills that the instructional groups perceived to have the greatest and least importance and confidence in performing daily nursing care, a means and rank order of means of each item was prepared. Table 5 contains a summary of the rank order of Importance and Confidence.

The items ranked as having the most importance in daily nursing care were:

Auscultating breath sounds
Palpating pulses
Assessing bladder distention

The items ranked as having the least importance in daily nursing care were:

Assessing head/neck
Assessing abdomen
Assessing sensation

The items ranked as being performed most confidently were:

Table 5

Rank Order of Importance and

Confidence in Performing Specific Skill Areas

	Rank Order*					
	Importance			Confidence		
Skill Area	A	B	C	A	B	C
Head/neck	8	7	8	5	3.5	3
Breath sounds	1	2	1	6	7	6.5
Heart sounds	4	2	6.5	8	8	8
Abdomen	6	5.5	6.5	7	5.5	6.5
Bladder	4	4	2.5	2.5	1.5	4.5
Range of Motion	2	8	4.5	1	3.5	2
Pulses	4	2	2.5	4	1.5	1
Sensations	7	5.5	4.5	2.5	5.5	4.5

* 1 = Most important/confident.

8 = Least important/confident.

Range of motion

Assessing bladder distention

Palpating pulses

The items ranked as being performed least confidently were:

Auscultating heart sounds

Auscultating breath sounds

Assessing abdomen

A Spearman Correlation Coefficient was computed on the rank order of Importance and Confidence means and a low correlation (r=.41) was found between the importance attached to the skill and the confidence level in performing the skill. This relationship was not statistically significant.

Table 6 indicates that the self-study group (C) found only five of the eight specific skills important to very important in daily nursing care, while the teleconference (A) and traditional (B) groups indicated eight and seven of the skills, respectively, were very important to important. Table 7 shows that the three groups indicated a slightly confident to not confident feeling performing all of the specific skill areas.

An analysis of variance was computed to test differences in importance and confidence levels for the

eight specific skill areas between instructional groups. Tables 6 and 7 reveal that the teleconference group (A) perceived range of motion exercises as significantly more important than did the traditional group (B), and the teleconference group (A) was significantly more confident performing these skills than was the traditional group (B). One can speculate that these differences may be related to the large percentage (45%) of the teleconference group (A) who worked in a rehabilitation hospital, and the fact that range of motion exercises are a very important aspect of rehabilitative nursing care. The traditional group (B) had 20 percent of the group working as occupational health nurses, and range of motion exercises likely play a less important role in this setting.

Posttest

Upon completion of the Physical Assessment course, members of each of the instructional groups were asked to respond to eight questions regarding learning strategies. Posttest information concerning confidence level, strategies employed to learn the skill, practice time and practice targets were sought from the groups. In addition, each group was asked individual questions about cognitive learning time (excluding practice)

Table 6

Comparison of Pretest Importance of Performing Specific Skill Areas by Instructional Groups

Skill Area	Mean Scores Group A (N=22)	Group B (N=21)	Group C (N=14)	F Ratio	F Prob.	Pairs[1]
Head/neck	3.0	3.0	2.7	.59	N.S.	
Breath sounds	3.7	3.3	3.4	1.4	N.S.	
Heart sounds	3.5	3.3	2.9	2.1	N.S.	
Abdomen	3.3	3.1	2.9	.91	N.S.	
Bladder	3.5	3.2	3.3	1.2	N.S.	
Range of Motion	3.6	2.8	3.1	3.7	.05	A>B
Pulses	3.5	3.3	3.3	.57	N.S.	
Sensations	3.2	3.1	3.1	.20	N.S.	

1 Significant differences between pairs as shown by the Scheffe' procedure (.10).

Table 7

Comparison of Pretest Confidence in Performing Specific Skill Areas by Instructional Groups

Skill Area	Mean Scores Group A (N=22)	Group B (N=21)	Group C (N=14)	F Ratio	F Prob.	Pairs[1]
Head/neck	2.2	2.3	2.3	1.3	N.S.	
Breath sounds	2.1	1.9	1.9	.65	N.S.	
Heart sounds	1.7	1.7	1.6	.12	N.S.	
Abdomen	1.9	2.2	1.9	.42	N.S.	
Bladder	2.6	2.5	2.2	1.3	N.S.	
Range of Motion	2.9	2.3	2.6	3.3	.05	A>B
Pulses	2.4	2.5	2.8	1.0	N.S.	
Sensations	2.6	2.2	2.2	1.3	N.S.	

1 Significant differences between pairs as shown by the Scheffe procedure (.10).

spent on the course, and attitude toward the specific teaching method.

Strategies employed to learn the skill. Each of the three groups was asked to indicate the strategies that had been used to learn the physical assessment skill.

The teleconference group (A) used attendance at sessions, completion of the workbook and viewing of the videos as the main strategies to assist with learning. The traditional group (B) utilized the same opportunities plus actual and mental practice. The self-study group (C), with the exception of not being able to attend sessions, utilized the same strategies as the traditional group.

The teleconference group (A) employed the lowest percentage of actual (36%) and mental practice (46%), while the self-study group (C) utilized the textbook most frequently (93%).

Other learning resources utilized. Each group chose to use books in addition to the textbook provided. The teleconference group (A) chose the "Other" category (27%) and indicated that course materials from work colleaques had been used.

Practice time. As indicated in Table 8, the hours of practice varied among the groups. The

Table 8

Percentage Distribution of Practice Time by Instructional Groups

Hours of Practice*	Group A (N=22)	Group B (N=21)	Group C (N=14)
0 - 4 hours	88	62	50
5 - 15 hours	23	10	36
over 15 hours	0	29	14

* Totals may not equal 100% due to rounding.

tendency was for practice time to be low. Groups A, B, and C had 88%, 62%, and 50%, respectively, record four hours or less of practice. The traditional group (B) had twenty-nine percent of the group record over 15 hours of practice. The teleconferencing group (A) did the least amount of practice.

Practice targets. The teleconference group (A), when they did practice, did so most frequently on families (46%), patients (36%), and classmates(32%). The traditional group (B) practiced on classmates (100%) and also on family (48%) and friends (29%). The self-study group (C) practiced most frequently (93%) on family members and patients. Because of the scheduling of the workshop hours, the traditional group (B) likely had little opportunity to practice on patients.

Cognitive learning time. Each group was asked a different question about the amount of time spent on cognitive learning activities (excluding practice). The teleconference group's (A) attendance at the scheduled teleconference sessions was less than anticipated. Forty-two percent attended half or less than half of the sessions; fifty-nine percent of the group attended more than half of the sessions.

The traditional group (B) had one hundred percent attendance at the workshop sessions. This group reported that eighty percent invested less than 10 additional hours (excluding workshop and practice hours) to learn the skill. The self-study group (C) did not have any attendance hours to report, but indicated that fifty-six percent of the group put in under 30 hours (excluding practice) to learn the skill and forty-four percent of the group put in over 30 hours.

Attitude toward the instructional method. Each group member was asked about attitude toward the instructional method and whether, if given the opportunity, they would learn another nursing skill taught by the same teaching method.

Table 9 summarizes the attitude toward the instructional method. Only thirty-six percent of group A liked teleconferencing as a teaching method and would take another nursing skill course this way. Groups B and C attitude were better toward the instructional method. Ninety-five percent of group B and sixty-four percent of group C liked their instructional method. All of the traditional (100%) and the majority of the self-study group (64%) would take another course by the same teaching method.

Table 9

Percentage Distribution of Posttest Attitude Toward Instructional Method by Instructional Groups

Attitude	Group A (N=22)	Group B (N=21)	Group C (N=14)
Liked teaching method	36	95	64
Disliked teaching method	64	5	36
Would take another course	36	100	64
Wouldn't take another	64	0	36

* Totals may not equal 100% due to rounding.

DIFFERENCES IN PSYCHOMOTOR SKILL PERFORMANCE OF THE INSTRUCTIONAL GROUPS

For the purposes of this study, the term "gain" was used to refer to psychomotor performance. Pretest scores were subtracted from posttest scores to compute the gain, or the psychomotor performance. This section addresses sub-problem 1, the gain experienced by each group, and comparisons of the gain of the groups are presented.

In the final section the relationship between the psychomotor gain and key variables is discussed. One-way analysis of variance statistics were used in situations where interval data were available from more than two groups. However, when the data were drawn from two groups, the t-test was used as a statistical technique. The focus in this presentation is on the identification and discussion of those items in which there were statistically significant mean differences.

Sub-Problem 1

Is there a difference in the psychomotor performance of physical assessment when the skill is taught by teleconferencing compared to traditional and self-study methods?

Table 10 summarizes the differences among the groups' means of pretest scores and posttest scores

Table 10

Comparison of Pretest and Posttest Mean Scores by Instructional Groups

Skill Area	Pretest Group A (N=22)	B (N=21)	C (N=14)	F Ratio	F Prob.	Pairs[1]	Posttest Group A (N=22)	B (N=21)	C (N=14)	F Ratio	F Prob.	Pairs[1]
Head/neck	3.9	2.9	2.8	7.5	.01	A>B,C	7.8	14.2	11.9	10.0	.001	B,C>A
Breath sounds	10.2	9.1	8.7	1.0	NS		12.3	13	12.3	4.5	.05	B>A,C
Heart sounds	3.2	2.2	2.7	4.1	.05	A>B	5.1	6.7	5.9	10.4	.001	B>A
Abdomen	12.5	11.9	6.4	8.3	.001	A,B>C	20.0	23.0	21.5	6.1	.01	B>A
Bladder	.05	.00	.07	.7	NS		.7	1.6	.6	12.7	.001	B>A,C
Range of Motion	22.5	19.4	21.9	.9	NS		27.5	31.2	32.0	5.0	.01	B,C>A
Pulses	3.5	3.1	4.5	7.6	.01	C>A,B	4.2	4.2	4.9	3.2	.05	C>A,B
Sensation	6.9	5.1	4.9	2.2	NS		11.1	15.0	12.9	5.1	.01	B>A
Total	62.6	53.8	52.0	4.0	.05	A>B,C	88.6	108.8	102.0	10.6	.001	B,C>A

1 Significant differences between pairs as shown by the Scheffe Procedure (.10).

according to the eight skill areas that were examined. On the pretest scores the teleconference group (A) did significantly better on the total mean score than the other two groups. Examining the eight specific areas shows that on four of the eight areas there were no significant differences on the pretest scores. The groups had similar mean scores on assessing breath sounds, assessing the bladder, range of motion exercises and assessing sensation.

The posttest total mean scores showed that the traditional (B) and self-study (C) groups did significantly better than did the teleconference (A) group. On the individual areas, the traditional (B) and/or self-study group (C) also did significantly better on the posttest mean scores than did the teleconference group (A). In seven of the eight specific skills areas, the traditional group (B) did better than did the teleconference group (A). In three of the eight areas, the self-study group (C) had a significantly higher mean score than the teleconference group (A). In only one case, assessing pulses, did the self-study group (C) do significantly better than the traditional group (B).

A *t*-test comparison of the differences between the means of the pretest and posttest scores was performed. Each of the three groups showed significant

gains on each of the posttest items as well as on the total posttest mean scores. This was the result that would be hoped for.

The difference between pretest and posttest scores of the groups was computed and the psychomotor gains were examined. Table 11 contains the comparison of gains by instructional groups. The total mean gain scores are interesting in that the traditional (B) and the self-study (C) groups gained significantly more than did the teleconference group (A).

On two of the items assessed, breath sounds and pulses, there were no significant differences in the gains in psychomotor performance. All groups had high pretest scores in these two areas. Consequently, less actual gain could occur in these areas and the gain that did occur was not significant. These items were also the items that were ranked as very important in daily nursing care.

On three of the remaining six items the traditional (B) and the self-study (C) groups gained significantly more than did the teleconference group (A), and on three items, group B or C did better than group A. There were no cases where the teleconference group (A) did significantly better than the other groups.

Table 11

Comparison of Gain by Instructional Groups

Skill Area	Gain by Group A (N=22)	B (N=21)	C (N=14)	F Ratio	F. Prob.	Pairs[1]
Head/neck	3.9	11.3	9.1	13.7	.001	B,C>A
Breath sounds	2.1	3.9	3.6	1.7	N.S.	
Heart sounds	1.9	4.5	3.1	17.6	.001	B,C>A,B>C
Abdomen	7.5	11.1	15.1	8.2	.001	C>A
Bladder	0.6	1.6	.05	14.0	.001	B>A,C
Range of Motion	5.0	11.7	10.1	4.5	.05	B>A
Pulses	0.7	1.1	0.4	1.8	N.S.	
Sensations	4.2	9.9	8.0	13.0	.001	B,C>A
Total	26.0	55.0	50.0	20.5	.001	B,C>A

1 Significant differences between pairs as shown by the Scheffe procedure (.10).

RELATIONSHIPS BETWEEN PSYCHOMOTOR PERFORMANCE AND THE VARIABLES

In this section, the findings about the relationships between the gain or the psychomotor performance and key variables are discussed. To test statistical differences, one-way analysis of variance, t-tests and correlation statistics were used.

Sub-problems 2,3 and 4 are addressed in this section.

Sub-problem 2

To what extent does the pretest importance attached to these skills affect psychomotor performance when the skill is taught via teleconferencing, traditional and self-study methods?

The pretest importance attached to the eight specific skill areas did not affect the posttest psychomotor mean scores when correlation statistics were examined. There was no significant correlation between importance and learning for any of the three instructional groups. Neither did the importance attached to the skill areas have a statistically significant impact on the gain scores.

Sub-problem 3

To what extent do demographic and academic variables of age, nursing experience and educational preparation affect psychomotor performance?

Age. The psychomotor performance was examined by age groups of under 30, 30-39 years and over 40 years. Comparison of age to gain scores using an F test showed no areas where there were significant differences among groups.

Nursing Experience. The relationship of nursing experience to gain was examined. The data were grouped according to 0-5 years experience, 6-15 years experience and over 16 years experience. The F test was used to examine the relationship and showed no significant effect. There were no specific instances where nursing experience made a significant difference in the psychomotor learning that occurred. Although it might be expected that more experienced nurses would have had more gain, this was not the case.

Educational preparation. Only four nurses out of the total sample had a previous course in physical assessment. A t-test comparison between the means of those with a previous course in physical assessment and the gain scores showed that those with the course did better than those without in each of the eight specific

areas and on the total skill. These are the results that could be expected. With such a small number (4) in one of the groups being compared, however, the t-test comparison would not be considered very reliable.

Place of employment. On the total gain scores, an F test showed that there were no significant differences between the nurses who worked on the medical-surgical, extended care or other areas such as occupational health and operating room. Although this factor did not affect the psychomotor performance of the groups, the unclear responses to this question in the pretest, suggests that the effect of this variable requires further examination.

Sub-problem 4

To what extent do instructional variables such as practice, cognitive learning time, confidence and attitude affect the psychomotor performance of physical assessment.

Practice time. Correlation statistics were examined to determine the effect of practice on mean gain scores. Table 12 presents Pearson correlation coefficients that show the relationship between

Table 12

Correlation Between Practice Time and Gain

Specific Gain	r	R^2	p
Head/neck	.52	.27	.001
Breath sounds	-.04	.00	N.S.
Heart sounds	.27	.07	.05
Abdomen	.27	.07	.05
Bladder	.24	.06	.05
Range of Motion	.40	.16	.01
Pulses	.39	.15	.01
Sensation	.27	.07	.05
Total Gain	.50	.25	.001

practice and gain in psychomotor performance. As would be expected, the more practice, the more gain in psychomotor performance. Examining the specific areas shows that in seven of the eight areas assessed there was a significant correlation. However, in assessing breath sounds the correlation was not significant. A possible explanation for this may be found in that the mean group scores (Table 10) for assessing breath sounds were high prior to teaching.

In the seven areas where a positive correlation was found, the correlation was low. Examining R^2 (Table 12) indicates the amount of variance in gain scores associated with practice time. Other factors have played a bigger part in gain scores than practice.

Table 13 shows the correlation between practice and gain by instructional group and reveals that only the teleconference group (A) showed a moderate correlation between practice and gain. The relationship between practice and gain was not significant for the other two instructional groups.

Cognitive learning time. Cognitive learning time for each group had to be defined differently. For the teleconference group (A), it was attendance at the teleconference sessions. For the traditional group (B), it was any extra hours, excluding practice that

Table 13

Correlation Between Practice Time and Gain by Instructional Groups

Practice by Group	r	R^2	p
Teleconference	.54	.29	.01
Traditional	.32	.10	N.S.
Self-Study	.32	.10	N.S.

were logged and for the self-study group (C) it was the number of hours spent in self-study, excluding practice. Table 14 shows correlations between gain scores and cognitive learning for each group. The teleconference group (A) had a high correlation between attendance and mean gain scores. If participants attended the sessions, they seemed to learn the content and perform the skill better than if they did not attend. Cautious speculation might suggest that the teleconference instructional method contributed to effective learning. The additional cognitive learning time logged by the other two groups was not significantly related to the mean gain scores.

Limitation in the question by nature of the responses did not allow for further examination of the effect of additional learning time by the traditional (B) and self-study groups (C) on gain scores.

Confidence. Participants in all groups were asked on the pretest to indicate the level of confidence felt on the total skill and on each of the specific skills performed in daily nursing care. Each of the groups seemed to start at approximately the same level of confidence. Following the instruction, participants were again asked to indicate their

Table 14

Correlation Between Cognitive Learning Time and Gain by Instructional Groups

Cognitive Learning Time	r	R^2	p
Teleconference Group	.75	.56	.001
Traditional Group	.25	.06	N.S.
Self-Study Group	.30	.09	N.S.

confidence level. The rating scale used was 1=confident, 2=somewhat confident, 3=confident with some skills, 4=very unsure. The lower the number, the higher the level of confidence.

Table 15 reveals that there were significant differences between the pretest and posttest confidence levels in the three groups. The teleconference group (A) felt less confident following the teleconference teaching than did the self-study (C) and traditional groups (B). The traditional and self-study groups gained confidence following their course. Each of the groups seemed to be similarly confident on the pretest.

Attitude. Each group was asked to indicate their attitude toward the instructional method on the pretest and on the posttest.

A *t*-test comparison of the posttest attitude toward the instructional method to the gain is summarized in Table 16. On the total mean gain scores those participants who liked their instructional method did significantly better than those who disliked the instructional method. These results could be expected.

Table 15

Comparison of Pretest and Posttest Confidence by Instructional Groups

Confidence	Group A (N=22)	B (N=21)	C (N=14)	F Ratio	F Prob.	Pairs[1]
Pretest	2.9	2.9	2.8	.16	N.S.	
Posttest	3.0	2.2	2.1	9.2	.001	A>B,C

[1] Significant differences between pairs as shown by the Scheffe' procedure

Rating scale used: 1 = confident
2 = somewhat confident
3 = confident with some
4 = very unsure

Table 16

Comparison of Posttest Attitude to Gain

Gain	Attitude		t	
	Liked (N=37)	Disliked (N=20)	Value	Prob.
Total Gain	48.8	31.1	3.39	.001

SUMMARY

In this chapter the data collected from each of the instructional groups were discussed and a discussion of the analysis of the data were provided.

Percentage distributions were used to describe the demographic and academic profiles of the instructional groups. The pretest importance of the skills to daily nursing care and the confidence level performing the aspects of the skill were rank ordered according to means.

One-way analysis of variance, t-tests and correlation statistics were used to determine statistically significant mean differences in the psychomotor performance of physical assessment between instructional groups. The same statistics were used to examine relationships between key demographic, academic and instructional variables and psychomotor performance of physical assessment.

CHAPTER 5

SUMMARY, CONCLUSIONS AND IMPLICATIONS

A summary of the study, conclusions and implications are provided in this chapter. The first section of the chapter provides a summary of the problem, purpose, methodology, data analyses and findings. The conclusions drawn from the findings are presented in the second section. The third section presents some implications for education and research.

SUMMARY

Teleconferencing is a relatively new teaching methodology in nursing education. It's usefulness in teaching the psychomotor skill domain has not been widely evaluated. This study was designed to provide nurse educators with information about the effectiveness of teleconferencing as an alternate teaching strategy and its' effectiveness teaching advanced nursing psychomotor skills.

Purpose

The purpose of this study was to compare psychomotor learning of eight specific aspects of physical assessment, an advanced psychomotor skill taught by teleconference, traditional and self-study methods.

Sub-problems

The following sub-problems were addressed in this study:

1. Is there a difference in the psychomotor performance of physical assessment when the skill is taught by teleconference compared to traditional and self-study methods?

2. To what extent does the pretest importance attached to these skills affect psychomotor performance when the skill is taught via teleconferencing, traditional and self-study methods?

3. To what extent do demographic and academic variables of age, nursing experience, and educational preparation affect the psychomotor performance of physical assessment?

4. To what extent do instructional variables such as practice, cognitive learning time, confidence and attitude affect the psychomotor performance of physical assessment?

Methodology

Data were collected using a pretest and posttest questionnaire and psychomotor performance criteria. Demographic, academic, instructional and psychomotor performance information was collected from three groups of registered nurses taking a non-credit physical assessment course each by a different instructional method. The same content was taught by the same instructor utilizing a common workbook and videos. One group was taught the course via teleconference sessions, another group was taught the course via the traditional on-campus method, and the final group took the course via the self-study method.

The sample came from volunteers randomly selected from the registrants for each of these methods. Anonymity was guaranteed to the participants and employing institution.

Data Analyses

Percentage distributions were used to discuss the demographic and academic data profile of the three instructional groups. Rank order of means were used to determine the importance of the eight specific aspects of physical assessment to daily nursing care and the confidence felt by nurses in performing them prior to the course.

One-way analysis of variance, t-tests and Pearson product-moment correlation statistics were used to determine the statistically significant mean differences. These statistics were used to identify the psychomotor learning that each group experienced and to compare gains among groups. To determine gains, the mean value of the pretest skill score was subtracted from the mean value of the posttest psychomotor performance score. These statistics were also used to identify the key variables that affected the gain or the psychomotor skill learning that had occurred with each instructional method.

Findings

Profile of Instructional Groups

Teleconference group (A). Slightly more than two-thirds of the teleconference group (A) were over the age of 35 years, with a third of this group having over fifteen years of nursing experience. Twenty-three percent, of this group had administrative duties, and fifty percent worked in rehabilitative nursing. No one in this group had previous courses in physical assessment. The motivation to take the non-credit course was to improve skills in nursing and to learn more about physical assessment.

This group agreed with the other two groups that auscultating breath sounds, palpating pulses and

assessing bladder distention were important in daily nursing care. The teleconference group differed from the other groups in that range of motion was rated as important and the group felt confident performing the skill.

The teleconference group had a low attendance rate at the sessions: forty-two percent of the group attended half or less of the teleconference sessions. However, the relationship between attendance and gain was high for this group. When they did attend, they seemed to increase psychomotor performance. This group had the least amount of practice. Again, the teleconference group had a fairly high correlation between practice and gain. When practice was done, mean gain scores improved.

Attitude toward the instructional method was poor. About two-thirds of the group did not like the teaching method and would not take another nursing skill course by teleconference. Twelve percent withdrew due to reasons such as lack of time to attend sessions, inconvenient scheduling times, equipment failure and did not participate in the posttest or data analyses.

Traditional group (B). This group was an older group of nurses, with seventy-one percent of this group over the age of 35 and the highest percentage over the age of 45 years. They had less nursing experience;

approximately one-half of this group had 6-15 years of nursing experience. Most of this group were staff duty nurses, with one-quarter of the group working in occupational health nursing. Two members of this group had a previous course in physical assessment. Motivation to take the non-credit physical assessment via the workshop method was mainly to improve skills in basic nursing care. The traditional group ranked importance and confidence on the individual aspects of the skill in a similar manner to the other groups.

Because of the scheduling of the workshop sessions, this group had full attendance and no attrition. The traditional group did not have a lot of opportunity to practice due to the course being offered in a two-week period, but more practice hours were logged for this group than for the teleconference group. Most of this group liked the traditional method of teaching a nursing skill and would take another skill course by the same method. Attrition rate in this group was nil.

Self-study (C). This was the youngest of the groups, with thirty-six percent of the group under age 35. This group had less nursing experience, with eighty-six percent of the group having 0-15 years experience. All of this group were staff duty nurses without any additional duties assigned. One person in this group had a previous course in physical

assessment. As in the other two groups, most of the self-study group indicated they were motivated to take the course to improve skills in nursing. The self-study group recorded the highest number of practice hours with one-third of the group practicing 4-8 hours and fourteen percent practicing over 15 hours.

The attitude toward the teaching method was exactly reversed to that of the teleconference group. Sixty-four percent of this group liked the self-study method and would take another skill course via the same method. Attrition in this group was thirty percent. Reasons given for withdrawing from the study were that the course was too heavy, busy domestic and work schedules, dislike of the instructional method.

Differences in psychomotor skill performance. On the psychomotor skill pretest, the teleconference group had the highest mean scores with the other two groups being very close in their mean scores. On the posttest, again the traditional and self-study groups performed at similar levels, but the teleconference group was at a significantly lower level of performance.

Gain was computed by subtracting the pretest score from the posttest score. The traditional and self-study groups gained similarly, while the teleconference

groups' mean score was half that of the other two groups. This group started out with the highest pretest psychomotor score, so significantly less learning occurred when this was taken into account.

Relationship between psychomotor skill performance and the variables. The effect of the variables of age, nursing experience, educational preparation, practice time, cognitive learning time, confidence and attitude on gain were explored.

The variables of age, and nursing experience were not significantly related to the psychomotor skill acquisition. Those nurses who had a previous course in physical assessment did better than those who had no previous course in this skill.

On the total mean score and in seven out of eight areas examined, there was a significant correlation between practice and gain. In one area, assessing breath sounds, the relationship was not significant. The group mean scores for this area were high on the pretest, hence less learning could occur.

Cognitive learning time findings were limited because different questions were asked of each group. However, the teleconference group did show a high correlation between attendance at sessions and gain.

Confidence as a variable showed interesting results. Each of the groups had started the course

with similar levels of confidence. The teleconference group lost confidence following the course. The traditional and self-study groups gained confidence following their course.

Consistently, those groups that liked their instructional method did significantly better than those that did not. The traditional and self-study groups had higher mean scores on the posttest and liked their instructional method. The teleconference group's attitude toward the instructional method was poorer, and the posttest mean scores were lower.

The variables of practice, confidence and attitude were significantly related to psychomotor performance. Cognitive learning time for the teleconference group was also significantly related to the group's psychomotor performance.

CONCLUSIONS

The following conclusions were based on the findings of the study:

1. There was a difference in the psychomotor performance of physical assessment when the skill was taught by teleconferencing and compared to traditional and self-study methods. Teleconference instruction was not effective in teaching an advanced nursing psychomotor skill such as physical assessment.

2. The pretest importance attached to aspects of the skill did not affect psychomotor performance. The more important an aspect was to basic nursing care did not have an effect on the learning that occurred.

3. The demographic variables of age and nursing experience did not affect the psychomotor performance of physical assessment. The variable of educational preparation did affect learning positively. Those with previous course work in physical assessment had a significantly better psychomotor performance.

4. Instructional variables such as practice, cognitive learning time, confidence and attitude had a positive effect on the psychomotor performance of physical assessment. Lack of practice and lack of attendance by the teleconference group affected the psychomotor performance negatively.

IMPLICATIONS

The findings of significant differences in psychomotor performance between teleconference, traditional and self-study instructional methods should be interpreted within the limitations of this study. The small sample size poses a threat to the validity of findings by causing mean differences between groups to be statistically undetectable.

Implications for Education

Teleconferencing as an instructional method to facilitate learning of the psychomotor component of physical assessment is not clearly supported as an independent alternative to traditional classroom/laboratory instruction, but perhaps as a method that can be combined with other instructional methods.

The results of this study have implications for administrative decisions with respect to offering nursing skill courses through distant delivery methods. Two of the three instructional methods investigated in this study would be suited to distance learners who are employed and have domestic responsibilities.

The combination of self-study and teleconferencing could eliminate the need for the physical presence of an instructor on-site to facilitate the psychomotor skill acquisition. Such an arrangement also has budgetary implications.

The "ideal" learning opportunity has traditionally been a process which provided the learner with face-to-face contact with a teacher. Technologies have emerged which provide interactivity between the learner and teacher regardless of distance. Governments have challenged educational institutions to utilize emerging technologies to reduce education costs, yet

increase the educational coverage to allow equal access to all Canadians.

These findings have implications for decisions being made about programming credit and non-credit continuing education and university level courses for nurses. The thrust in the nursing profession of the baccalaureate degree as the entry to practice requirement by the year 2000 has put pressure on educational institutions to increase offerings to nurses in a more flexible manner and thereby increase enrollments.

These findings should be of interest to nursing inservice coordinators who must decide how to stretch the decreased education portion of the hospital budgets to meet the needs of the greatest number of people.

Implications for Research

This study provided some useful information regarding learning psychomotor skills via teleconferencing compared to traditional and self-study methods. More research is needed to support or refute the conclusions of this study. Although each of the instructional methods studied have advantages as alternate instructional strategies, their effectiveness cannot be generalized to all learning situations.

Further research might expand the data base as follows:

1. Replication of this study with a larger sample of nurses and tighter design controls to determine if the findings differ significantly from the findings of this study.

2. Replication of this study using a different psychomotor nursing skill with a larger sample and a control group to determine if there are any similarities in the findings.

3. Replication of this study using a credit course and measurement of the cognitive as well as the psychomotor learning.

4. Replication of the study with a larger sample of nurses with the measurement of the entire physical assessment skill.

5. Further research should be conducted comparing psychomotor skill acquisition by teleconferencing to other teaching methodologies.

6. Further research into the low attendance at scheduled teleconference sessions. Employers should explore the reasons given by those who withdrew from the teleconference group in an effort to make the instructional method more appealing to students.

7. Further research into the finding in this study that the teleconference group lost confidence after the sessions when learning a psychomotor skill.

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APPENDIX A

PRETEST QUESTIONNAIRE

PHYSICAL ASSESSMENT
PRETEST

Do not write in this space

Please answer the following questions by checking the appropriate space (s), or writing in the answers which provide the correct information about you.

PART A: DEMOGRAPHIC

1. What is your present position?

1.Staff duty nurse	____	1
2.Nurse educator	____	2
3.Nurse administrator	____	3
4. unit supervisor	____	4
5. shift supervisor	____	5
6.Other (Specify)	____	6

2. What is your clinical area of practice?

1.Medicine	____	7
2.Surgery	____	8
3 Pediatrics	____	9
4.Psychiatry	____	10
5.Obstetrics	____	11
6.Extended Care	____	12
7.Intensive Care Unit	____	13
8.Emergency	____	14
9.Other (Specify)	____	15

3. Number of years employed in nursing: Count present year as a complete year.

1.1 year or less	____	
2.2-5 years	____	
3.6-10 years	____	16
4.11-15 years	____	
5.16-20 years	____	
6.over 20 years	____	

4. What is your age in years?

1.Under 25	____	
2.25-29	____	
3.30-34	____	
4.35-39	____	17
5.40-44	____	
6.45-49	____	
7.50 or over	____	

5. Gender? F ____ M ____ 18

PART B: ACADEMIC

6. Educational background?

1.R.N.
2.Year of graduation ____ 19

1.Post-R.N. certificates ____
Specify _____ 20
2. Year of graduation ____

1.Baccalaureate degree ____
Faculty _____ 21
2. Year of graduation ____
University _____

1.Other(include short courses)
_____
2. Year of graduation _____
Certificate _____ 22

7. Have you previously taken a course in physical assessment?

1.Yes ____
2.No ____ 23

IF YOU REPLIED YES TO QUESTION 7, ANSWER QUESTIONS 8 AND 9.
IF YOU REPLIED NO TO QUESTION 7, MOVE TO QUESTION 10.

8. Check the description that best describes the course you took.

1.Credit course ____ 24
2.Non-credit course ____

1.60 -90 hours ____
2.30 -60 hours ____
3.20 -30 hours ____
4.15 -20 hours ____ 25
5. 8 -15 hours ____
6.under 8 hours ____
7.Other _____

9. Where did you take this course?

1.university post-degree course ___
2.university basic degree course ___
3.university extension course ____
4.college credit course ____ 26
5.college non-credit course ____
6.college workshop ____
7.hospital inservice course ____
8.Other (Specify)_____

IF YOU REPLIED NO TO QUESTION 7, RESPOND TO THE NEXT QUESTION.

10. If you have not taken a course in physical assessment, indicate how you feel about your assessment skills?

1.confident
2.somewhat confident ____ 27
3.confident with some ____
(specify)_____
4.very unsure ____

11. How do you feel about teleconferencing as a way of learning a skill?

1.I like it. 28
2.I don't like it. ____
3.I don't know yet. ____

12. I am taking this course because? (More than one reason may be chosen.)

1. I want to learn more about physical assessment.	___	29
2. I want to improve my skills.	___	30
3. I am expected to participate in inservice.	___	31
4. I am interested in getting my degree in nursing.	___	32
5. Other (Explain) _____		33

PART C: SPECIFIC SKILLS

Please indicate the importance of each of the following skills to you in your work and also, the level of confidence you feel with each skill.

	IMPORTANCE				CONFIDENCE				DO NOT WRITE IN THIS SPACE
	(1) Not Important	(2) Slightly	(3) Important	(4) Very Important	(1) Not Important	(2) Slightly	(3) Important	(4) Very Important	
1. Assessing pupil response	( )	( )	( )	( )	( )	( )	( )	( )	
2. Palpating lymph nodes	( )	( )	( )	( )	( )	( )	( )	( )	
3. Auscultating breath sounds	( )	( )	( )	( )	( )	( )	( )	( )	
4. Auscultating normal heart sounds	( )	( )	( )	( )	( )	( )	( )	( )	
5. Auscultating bowel sounds	( )	( )	( )	( )	( )	( )	( )	( )	
6. Palpating the abdomen	( )	( )	( )	( )	( )	( )	( )	( )	
7. Determining bladder distention	( )	( )	( )	( )	( )	( )	( )	( )	
8. Range of motion exercies	( )	( )	( )	( )	( )	( )	( )	( )	
9. Palpation of peripheral pulses	( )	( )	( )	( )	( )	( )	( )	( )	
10. Assessing sensory status of the extremity.	( )	( )	( )	( )	( )	( )	( )	( )	

Thank you!

APPENDIX B

PSYCHOMOTOR PERFORMANCE CRITERIA

PSYCHOMOTOR PERFORMANCE CRITERIA
PHYSICAL ASSESSMENT

REGION		
HEAD/NECK		
pupils	inspects	1
pupillary reaction to light	shines light from temporal region	1
direct, consensual	inspects	2
pupillary reaction to accommodation dilation, constriction	instructs re distance	1
	observes dilation	1
	instructs re finger close	1
	observes constriction	1
Lymph nodes names	Palpation:	
	pre-auricular	1
	post-auricular	1
	occipital	1
	tonsillar	1
	submandibular	1
	submental	1
	superficial cervical	1
	posterior cervical	1
	deep cervical	1
	supra clavicular	1
	TOTAL	18
AUSCULTATES BREATH SOUNDS:		
Posterior thorax	disrobed to waist	1
	auscultation 3 areas upper,lower,lateral	3
	instructions(breathing inform if dizzy)	2
	uses diaphragm	1
	listens to one breath	1
Anterior thorax	auscultation 3 areas upper,lower,lateral	3
	uses diaphragm	1
	listens to one breath	1
	TOTAL	13

AUSCULTATES HEART SOUNDS:

Aortic, pulmonic Erb's, tricuspid, mitral	uses diaphragm and bell	1
	Bell applied lightly	1
	5 areas	5
	TOTAL	7

AUSCULTATES BOWEL SOUNDS:

Abdomen	auscultates prior to percussion, palpation	1
	inquires of tenderness	1
	technique(diaphragm pressed lightly)	1
	listens in 4 quadrants	4

PALPATES THE ABDOMEN:

Light palpation	4 quadrants	4
	Technique(finger pads, dipping motion)	4
	inquires of tenderness	1
Deep palpation	4 quadrants	4
	Technique (Hand position, deeply)	1
	Inquires of tenderness	1
	observes face	1
	TOTAL	23

DETERMINING BLADDER DISTENTION:

Abdomen	percusses from umbilicus to symphysis pubis	1
	diaphragm on midline, scratches down from umbilicus to symphysis pubis	1
	TOTAL	2

RANGE OF MOTION EXERCISES:

Arms-fingers	flexion, extension abduction, adduction	4
-wrists	flexion, extension, abduction, adduction	4
-elbows	flexion, extension suppination, pronation	4

-shoulders	flexion, extension, abduction, adduction, outward rotation inward rotation	6
Legs-toes	flexion, extension, abduction, adduction	4
-ankles	dorsiflexion, plantar flexion, inversion, eversion	4
-knees, hips	flexion to chest	1
	observes opposite thigh	1
-knees	extension	1
-hips	abduction, adduction external rotation, internal rotation	4
	TOTAL	33

PALPATES PERIPHERAL PULSES:

Arms-Brachial Radial	palpates	2
Legs-popliteal dorsalis pedis posterior tibial	palpates	3
	TOTAL	5

ASSESSES SENSORY STATUS:

	instructs close eyes, indicate	2
Face	uses cotton ball uses pin prick 3 regions	2
Arms	demonstrates sensation	1
superficial pain	instructions, technique	2
light touch	instructions, technique	2
vibration	instructions, technique	2
Legs		
superficial pain	instructions, technique	2
light touch	instructions, technique	2
vibration	instructions, technique	2
	TOTAL	17

GRAND TOTAL 125

APPENDIX C

POSTTEST QUESTIONNAIRE

PHYSICAL ASSESSMENT POSTTEST

Do not write in this space

1	2	3	4

Please answer the following questions by checking the appropriate space (s), or writing in the answers which provide the correct information about you.

PART A;

1. Indicate how you feel about performing physical assessment skills following your course.
   1. confident ___
   2. somewhat confident ___
   3. confident with some ___ 34
      (Explain)_____
   4. very unsure ___

2. What strategies did you use to learn the skill?
   1. attended sessions ___ 35
   2. completed workbook ___ 36
   3. viewed videos ___ 37
   4. read textbook ___ 38
   5. read articles ___ 39
   6. instruction by other team members ___ 40
   7. mental practice ___ 41
   8. actual practice ___ 42
   9. other (explain) ___ 43

3. What resources, other than the materials you were provided with, did you utilize to learn physical assessment skills?
   1. A.A.R.N. library ___ 44
   2. textbooks ___ 45
   3. journal articles ___ 46
   4. other course materials ___ 47

4. How much actual practice did you do?
   1. 0 hours ___
   2. 1-2 hours ___
   3. 2-4 hours ___
   4. 4-6 hours ___
   5. 6-8 hours ___
   6. 8-10 hours ___ 48
   7. 10-15 hours ___
   8. over 15 hours ___

5. On whom did you practice your skills?

1. friends	___	49
2. classmates	___	50
3. family	___	51
4. patients	___	52
5. animals	___	53
6. other (explain)	___	54

PART B: GROUP DATA.
IF YOU WERE PART OF THE TELECONFERENCE GROUP, ANSWER QUESTIONS 6-8.

IF YOU WERE PART OF THE SELF-STUDY GROUP, ANSWER QUESTIONS 9-11.

IF YOU WERE PART OF THE FACE-TO-FACE INSTRUCTION GROUP ANSWER QUESTIONS 12-14.

6. How many teleconference sessions did you attend?

1.	___	5.	___	
2.	___	6.	___	
3.	___	7.	___	55
4.	___	8.	___	

7. How do you feel about teleconferencing as a way of learning physical assessment?

1. I like it.	___	56
2. I don't like it.	___	

8. Would you learn another nursing skill by teleconference methods?

1. Yes	___	
2. No	___	57
3. other (explain)	_____	

---

9. How many hours did you spend on this self-study course (excluding practice)?

1. under 5 hours	___	
2. 5-10 hours	___	
3. 10-15 hours	___	58
4. 15-20 hours	___	
5. 20-25 hours	___	
6. 25-30 hours	___	
7. 30-40 hours	___	
8. 40-50 hours	___	
9. 50-60 hours	___	
10. over 60 hours	___	

10. How do you feel about self-study as a way of learning physical assessment?
    1. I like it. ___
    2. I don't like it. ___ 59

11. Would you learn another nursing skill by self-study methods?
    1. Yes ___
    2. No ___ 60
    3. other (explain)_____

12. Excluding workshop hours and practice, how many hours did you spend on this course?
    1. under 5 hours ___
    2. 5-10 hours ___
    3. 10-15 hours ___ 61
    4. 15-20 hours ___
    5. over 20 hours ___

13. How do you feel about workshops as a way of learning physical assessment?
    1. I like them. ___
    2. I don't like them ___ 62

14. Would you learn another nursing skill by attending a workshop?
    1. Yes ___
    2. No ___ 63

Thank you

APPENDIX D

INFORMATION LETTER

CONSENT

1986-08-28

Dear Participant

Your help is needed to conduct a study about an area of interest in nursing education - teaching skills via teleconferencing.

As a result of my experience in teaching physical assessment via teleconferencing, I decided that an interesting study for a Master's thesis would be to determine if a skill such as physical assessment can be learned effectively via teleconferencing without face to face instruction. This project will be under the direction of Dr. A. G. Konrad, University of Alberta.

Your site was chosen from the list of hospitals registered for the Alberta Hospital Association Fall 1986 series, Introduction to Physical Assessment. A letter of support for this study has been sent to your hospital by Mrs.Jan Moore, Director of Education and Teleconferencing, Alberta Hospital Association.

Your participation will involve:

a. between August 26 and September 12, 1986, a 30 minute time commitment for a written questionnaire and establishing the physical assessment skills you presently have.

b. Participation in eight, 1 hour teleconference sessions, September 12 to November 28, 1986.

c. between December 1 and January 15, 1987, (at a mutually agreed upon time) a 45 minute time

commitment for a questionnaire and to re-establish the level of physical assessment skills.

Participation in this study will give you the opportunity to realize the progress you make with these skills as a result of the series. Hopefully, the results will determine if changes are necessary with the teleconference program.

Participation in this study is voluntary and the participants will be anonymous in the results. It will not be possible to identify any individual or site in the results. The information will be confidential.

I hope you will consider helping me with this project and will complete the attached sheet and return it to your site facilitator by September 12, 1986. If you need further information, contact me at 464-7976 or leave a message at 462-5651.

Yours truly,

Pat A. Picketts, R.N. B.Sc.N.

Enclosure

CONSENT FORM

I, _____ would be willing to participate in the study being conducted by Pat Picketts, B.Sc.N., which involves learning physical assessment via teleconferencing.

My involvement in the study will consist of;

a. a pretest between August 18th, and September 12th, 1986 which will consist of a 30 minute time commitment for a questionnaire and establishing the physical assessment skills I presently have.

b. Participation in eight 1 hour teleconference sessions, between September 12th, and November 28th, 1986.

c. a posttest between December 1st and January 15th, 1987, which will consist of a 45 minute time commitment for a questionnaire and to re-establish the level of physical assessment skills.

I understand that I will remain anonymous in the study and information gathered by the researcher will be considered confidential. It will not be possible to identify me or my hospital in the results.

I understand that I may withdraw from participation in the study at anytime without penalty.

SIGNATURE_____ DATE_____

ADDRESS _____

_____

PHONE _____

1986-09-10

Dear Participant

Your help is needed to conduct a study about an area of interest in nursing education - teaching skills via teleconferencing.

As a result of my experience in teaching physical assessment I decided that an interesting study for a Master's thesis would be to determine if a skill such as physical assessment can be learned effectively via teleconferencing without face-to-face instruction. This project will be under the direction of Dr. A. G. Konrad, University of Alberta.

I am looking for nurses who would be interested in learning physical assessment via face-to-face instruction. This method would include attendance at a two day workshop, a workbook to guide your study, access to textbooks, articles and audio-visual aides.

Your participation will involve:

a. a 30 minute time commitment for a written questionnaire and establishing the physical assessment skills you presently have.

b. attendance at a two day workshop on physical assessment.

c. a 45 minute time commitment for a questionnaire and to re-establish the level of physical assessment skills.

Participation in this study will give you the opportunity to realize the progress you make with these skills as a result of the series. Hopefully, the results will determine which instructional method is most suitable for teaching the skill.

Participation in this study is voluntary and the participants will be anonymous in the results. It will not be possible to identify any individual or site in the results. The information will be confidential.

I hope you will consider helping me with this project and will complete the attached sheet and return it to me. If you need further information, contact me at 464-7976 or leave a message at 462-5651.

Yours truly,

Pat A. Picketts, R.N. B.Sc.N.

Enclosure

CONSENT FORM

I, _____ would be willing to participate in the study being conducted by Pat Picketts, B.Sc.N., which involves learning physical assessment via face-to-face instruction.

My involvement in the study will consist of;

a. a 30 minute time commitment for a written questionnaire and establishing the physical assessment skills I presently have.

b. attendance at a two day workshop on physical assessment.

c. a 45 minute time commitment for a questionnaire and to re-establish the level of physical assessment skills.

I understand that I will remain anonymous in the study and information gathered by the researcher will be considered confidential. It will not be possible to identify me or my hospital in the results.

I understand that I may withdraw from participation in the study at anytime without penalty.

SIGNATURE_____ DATE_____

ADDRESS _____

_____

PHONE _____

WITNESS _____ DATE_____

1986-09-10

Dear Participant

Your help is needed to conduct a study about an area of interest in nursing education - teaching skills via teleconferencing.

As a result of my experience in teaching physical assessment I decided that an interesting study for a Master's thesis would be to determine if a skill such as physical assessment can be learned effectively via teleconferencing, face-to-face instruction and self-study methods. This project will be under the direction of Dr. A. G. Konrad, University of Alberta.

I am looking for nurses who would be interested in learning physical assessment via self-study instruction. This method would include a workbook to guide your study, access to textbooks, articles and audio-visual aides.

Your participation will involve:

a. a 30 minute time commitment for a written questionnaire and establishing the physical assessment skills you presently have.

b. an independent study package which contains a workbook, videotapes, textbook and articles.

c. a 45 minute time commitment for a questionnaire and to re-establish the level of physical assessment skills.

Participation in this study will give you the opportunity to realize the progress you make with these skills as a result of the series. Hopefully, the results will determine which instructional method is most suitable for teaching the skill.

Participation in this study is voluntary and the participants will be anonymous in the results. It will not be possible to identify any individual or site in the results. The information will be confidential.

I hope you will consider helping me with this project and will complete the attached sheet and return it to me. If you need further information, contact me at 464-7976 or leave a message at 462-5651.

Yours truly,

Pat A. Picketts, R.N. B.Sc.N.

Enclosure

CONSENT FORM

I, _____ would be willing to participate in the study being conducted by Pat Picketts, B.Sc.N., which involves learning physical assessment via independent study.

My involvement in the study will consist of;

a. a 30 minute time commitment for a written questionnaire and establishing the physical assessment skills I presently have.

b. an independent study package which contains a workbook, videotapes, textbook and articles.

c. a 45 minute time commitment for a questionnaire and to re-establish the level of physical assessment skills.

I understand that I will remain anonymous in the study and information gathered by the researcher will be considered confidential. It will not be possible to identify me or my hospital in the results.

I understand that I may withdraw from participation in the study at anytime without penalty.

SIGNATURE_____ DATE_____

ADDRESS _____

_____

PHONE _____

WITNESS _____ DATE_____

APPENDIX E

CORRESPONDENCE

Mrs. J. Moore
Director, Education,
and Teleconferencing
Alberta Hospital Association
10025 108 Street
Edmonton, Alberta
T5J 1K9

July 21, 1986.

Dear Mrs. Moore.

Thank you for meeting with me on July 10th, 1986. I would like Alberta Hospital Association to give permission and support to experimental research that I would like to conduct in conjunction with a teleconference series that will be offered Fall, 1986. I will be teaching the series, Introduction to Physical Assessment and would like to do research on teleconferencing a psychomotor skill and use this as the basis for my master's thesis - Educational Administration.

Please find attached a description of the study and some information about myself.

I would be pleased to supply you with a copy of the findings and recommendations when the research is complete.

Thank you for agreeing to send a letter to each of the participating sites.

Yours truly,

(Mrs) Pat Picketts R.N. BScN
Graduate Student
Faculty of Education
University of Alberta

Home Address: 17 Mardale Crescent
Sherwood Park, Alberta
T8A 3N4

TELECONFERENCING PHYSICAL ASSESSMENT: EXPERIMENTAL STUDY OF A PSYCHOMOTOR SKILL IN NURSING

Teleconferencing is becoming accepted in the field of nursing as a viable method of presenting traditional content. The past ten years have seen nursing practitioners recognize the need for advanced psychomotor skills in the area of health assessment of patients and clients. A review of literature revealed there are few answers to the question of the effectiveness of this alternate teaching strategy in relation to learning nursing psychomotor skills.

The main purpose of this study is to compare eight specified aspects of physical assessment, an advanced psychomotor skill taught by teleconference, traditional and self- study methods.
face-to-face instruction.

The study is experimental incorporating three groups pretest-posttest design. A sample of 20-25 nurses per group will be randomly selected from volunteers from hospitals within 200 km of Edmonton. The participants will be assured of anonymity and confidentiality. All participants will take a non-credit course called Introduction to Physical Assessment. The pretest phase for all groups will consist of a written questionnaire and a practical test to demonstrate the level of the skills prior to the teaching. All groups will have the same self-study workbook and access to the same audiovisual aides. The first group will learn the skill via teleconferencing. The second group will learn the skill via traditional face-to-face instruction, while the third group will learn the skill by self-study methods. All groups will be posttested for performance of the eight specified skills of physical assessment. Correlation statistics, t-test and one-way analysis of variance will be used to describe the data.

This study is being done to fulfill requirements for a Masters - Educational Administration, University of Alberta. Advisor - Dr. A. Konrad.

1986-09-19

Mrs. Anne Loehler
Director of Nursing
Leduc General Hospital
P.O. Box 550
Leduc, Alberta
T9E 2Y3

Dear Mrs.Koehler

I am conducting research into the effectiveness of various methods used to teach skills in nursing, specifically physical assessment. As part of my study I need a group of staff nurse volunteers who would be willing to learn physical assessment by independent study.

Participation in the study would involve:

a. A 15 minute time commitment for a written questionnaire and establishing the physical assessment skills the participants presently have.

b. An independent study package which contains a workbook, videotapes, textbook and articles.

c. Between December 1 and January 15, 1987, (at a mutually agreed upon time) a 45 minute time commitment for a questionnaire and to re-establish the level of physical assessment skills.

I would like to request support for the research from your hospital administration by being allowed to recruit volunteers from your staff nurses. Once the nurses have volunteered, I would then randomly select a sample of 15 from a list of volunteers from 3-5 hospitals to participate in the study. The participants and hospitals will be assured of confidentiality and anonymity in the research. The individual nurse and hospital will not be identifiable in the results.

If you have any questions about this study or my request, you can contact me at 464-7976, or leave a message at 462-5651.I will contact you by September 24, 1986 to determine if your staff are willing to participate.
I hope you will consider helping me with this research which will be used as a Master in Education thesis. This project is under the direction of Dr. A.G.Konrad, University of Alberta. The research has also been supported by Alberta Hospital Association.

Yours truly,

(Mrs.) Pat A. Picketts, R.N. B.Sc.N.
Graduate Student
Department of Educational Administration
University of Alberta

cc. Mrs. Linda House

Alberta Hospital Association

10025 - 108 Street
Edmonton, Alberta
T5J 1K9
Telephone 423-1776

August 20, 1986
File: 1190-178

Mr. Sam Rao
Director of Nursing
St. Joseph's General Hospital
P.O. Box 490
VEGREVILLE, Alberta
T0B 4L0

Dear Mr. Rao:

Pat Picketts, the instructor for the Introduction to Physical Assessment teleconference course for which your hospital has registered, is in the process of completing requirements for her M.Ed. She has chosen as her thesis topic to do an assessment of how effectively physical assessment can be taught via the teleconference medium.

As the use of teleconferences for teaching of psychomotor skills is relatively new, we at AHA are very interested in Pat's study.

She may be contacting you to ask for volunteers from those nurses participating in the series. I would encourage you to support her if it is possible, by allowing your staff to volunteer for the study.

Enclosed is a brief outline of the research and a brief biography of Pat. This is a good opportunity as well to expose your staff to participation in a research study.

We will share the results with you when the research is complete.

Thank you in advance for your anticipated cooperation.

Sincerely,

(Mrs.) Jannice E. Moore
Director
Education Services

JEM:cla
Enclosures

cc: Pat Picketts
Valerie Wilbur
Fran Lazarowich